TDB-ACC-NO: NNRD439131

DISCLOSURE TITLE: A Computerized, Secure,
Shared Automated Parcel Machine
                   and Delivery System

PUBLICATION-DATA: IBM technical Disclosure
Bulletin, November 2000, UK

ISSUE NUMBER: 439

PAGE NUMBER: 2012

PUBLICATION-DATE: November 1, 2000
(20001101)

CROSS REFERENCE: 0374-4353-0-439-2012

DISCLOSURE TEXT:

   Automated Parcel Machine and Delivery
System
       Disclosed is a computerized, secure,
shared Automated Parcel
    Machine Delivery System (APMDS) for
unattended retrieval of Internet
    and mail ordered parcels. Traditionally,
consumers have relied on
    several methods for retrieving mail
ordered goods. The most common
    way is to have the parcel delivered
straight to a residential or
    business doorstep. Alternately, a parcel
can be held at a centralized

facility and retrieved by visiting an
attendant at the site.
    In
    certain circumstances, the parcel can be
retrieved without an
    attendant, but only if the customer has
either rented a dedicated
    secure box of sufficient size at a
centralized facility such as the
    United States Postal Service (USPS), or
the customer's neighborhood
    is equipped with a central USPS mailbox
containing a sufficiently
    large, shared secure box. As the
purchase of products via the
    Internet increases, the distribution
model of goods will change. In
    order to facilitate the change, a
centralized, automated, shared,
    secure method of retrieving mail ordered
parcels is needed. The
    computerized APMDS provides such a
mechanism.
    APM Design Description
    The following table lists the major
functions and associated acronyms
    used in describing the design of the
APMDS.

        Function or Term Description
    APM Automated Parcel Machine.
    APMDS Automated Parcel Machine Delivery
System. The APMDS is the
    entire concept involved with shipping
goods to an APM.

APMID Automated Parcel Machine Identification. Each APM site has a unique APMID.

APMSL Automated Parcel Machine Sticky Label. APMSLs are placed on every parcel that uses the APMDS. The key to the APMSL is a two-dimensional bar code that encodes the APMID, postage, and buyer, seller, and shipper information.

LAPMCC Local Automated Parcel Machine Control Computer. All automated functions at each APM site are control by the LAPMCC

RMT Rotating Mechanical Turntable. RMTs have divided partitions for holding parcels. All APMs have at least one RMT. The style and quantity of RMTs are dictated by frequency of use and are ordered as options when the APM site is established, or when it is upgraded.

MDSS Mechanical Drive Subsystem. The MDSS controls the rotation of the RMT as directed by the LAPMCC.

CISS Customer Interface Subsystem (CISS). The CISS allows for customer input to the APM's LAPMCC

ASSS Automatic Scanning Subsystem. The ASSS connects to the LAPMCC and is able to read two-dimensional bar codes.

CADSS Customer Access Door Subsystem. The CADSS provides the customer access to the APM to retrieve

his parcel. The CADSS is
designed in such a way to prevent theft,
injury, and sabotage.

PESS Parcel Ejector Subsystem. The PESS
ejects parcels from the RMT
into the CADSS.

CAPMCS Central Automated Parcel
Machine Computer System. The
CAPMCS manages all data aspects of the
APMDS. All LAPMCCs connect to
the CAPMCS.

APMBEP Automated Parcel Machine
Business Equipment Package. The
APMBEP includes a sticky label printer
and the associated application
software to generate APM sticky labels.

Figure 1 shows the basic block diagram
of the APMDS.

The CAPMCS performs the following
functions:
1.
Communication with all APMs in its
domain for the purpose of
inventory tracking, determining usage
fees, calculating APM vacancy,
and other general maintenance.

2. Initiating phone and e-mail
notifications to buyers.

3. Maintenance of a database of
parcel information that can be
made selectively and readily available
for publication via the
worldwide web.

Figure 2 shows a typical APM site
configuration. Each APM can be
configured with multiple options

including multiple RMT and/or RMT
styles. The CISS includes a presence
sensor, security camera,
display, keypad, Magnetic Stripe Reader
(MSR), and optionally, a
smart card reader allowing for automated
and secure customer
retrieval of parcels.
The ASSS is mounted stationary above
the
customer access door. The PESS is
positioned in such a way that
parcels can be ejected from the RMT into
the CADSS.
The LAPMCC Controls all APM
subsystems including the MDSS, CISS,
ASSS, CADSS. It also has a dedicated
secure communication link to the
CAPMCS.
Figure 3 shows an example of the APM
front.
APMDS Usage
Each APM is issued a unique APMID
upon its initial
installation. The concept of the APMID
is similar to the current ZIP
CODE system used by the USPS. In fact,
in the event that the APM is
located at a U.S. Post Office, the ZIP
CODE can serve as the APMID
since it is unique.
All APMIDs are preceded by the country
code in
which they reside to incorporate
worldwide functionality.
When a consumer places an order from

a mail order site (via phone,
internet, etc...) and wishes to use the
APMDS, the seller obtains the
desired APMID. If the buyer does not
know the APMID, the seller can
obtain the buyer's address, and locate
the closest APM via the CAPMCS
web-enabled database.
In order to use the APMDS, the seller
must supply a valid e-mail
address and/or telephone number at the
time of purchase. The buyer's
contact information is used to notify
the buyer when the parcel
arrives at the APM. This contact
information is encoded in a 2D bar
code and printed on a APMSL. The APMSL
is placed on the outside of
the box.
The seller's business uses equipment
provided through the
company that owns and manages the entire
APMDS to print the
APMSL. The software that sellers need to
utilize the APMDS is part of
the APMBEP. Each APMSL also includes the
appropriate postage needed
for the cost of shipping. Sellers are
able to obtain authorization to
issue postage from any shipping company
by either pre-purchasing it
from them, or by making account
arrangements with their desired
shipping company or companies. The
software provided with the
equipment package is able to interact

with software provided by the
various shipping companies so that the
issuance of postage can be
automated. The name of the company who
actually handles the shipping
of the parcel is printed on the APMSL in
human readable text.
This
ensures there is an easy way for a
seller who uses multiple shipping
companies to easily identify the
parcel's handler. The APMSL also
contains the seller's information so
that in the event that the buyer
does not retrieve the parcel, it can be
returned to the seller.
When the parcel arrives at the
destination APM, it has zero
postage due. The shipping company that
handles the parcel has access
to the stock entrance of the APM, as
granted and maintained by the
owner of the APMDS. The shipper places
the parcel into a vacant slot
on the RMT. When the shipper completes
his delivery and closes the
access door to the APM stocking area,
the LAPMCC senses the exit (via
the rear access door switch) and
initiates an automatic inventory
procedure.
As each parcel rotates around the RMT,
its bar code is
examined by the ASSS under control of
the LAPMCC. Any new parcels
found since the last automatic inventory

are identified. The LAPMCC

then contacts the CAPMCS with a command to initiate notification to

the buyer that his parcel has arrived. The CAPMCS then contacts the

buyer through their desired channel — e-mail, phone, or both. The

notification of the parcel's arrival at the APM also allows the

CAPMCS to begin tracking the time that it takes for the buyer to

retrieve it.

The buyer is given 24 hours to retrieve the parcel upon

notification. After the 24-hour period has expired, the individual

owner of the APM can collect additional fees at his discretion.

The

addition of fees after the 24-hour period provides an incentive for

the buyer to retrieve the parcel in a timely manner, thus ensuring a

higher vacancy rate at the APM.

As part of notification, the buyer receives a code that is used

for the unattended retrieval. When the buyer arrives at the APM, the

buyer enters the code via the CISS. The LAPMCC rotates the RMT until

the parcel is found. The parcel's location at this point is directly

in front of the customer access door, which is locked. The LAPMCC

then determines if any additional fees are due by contacting the

CAPMCS. If so, the amount is made known to the buyer via the CISS and
the buyer is able to pay the fees via a credit/debit/smart card.
Upon
zero due, the LAPMCC initiates a sequence to the PESS, which pushes
the parcel into the CADSS so that it can be removed. After 15
seconds, the LAPMCC begins a sequence to re-secure the door. The
CADSS has the ability to sense presence and pressure (as an elevator
door does) and continues with the door closing sequence until the
door is re-secured. The RMT is locked at all times when the customer
access door is unsecured.